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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,984	06/25/2001	Ji-Suk Hong	P 276570 P00HA103/US	7045

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PILLSBURY WINTHROP, LLP  
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MCLEAN, VA 22102

EXAMINER

SAGAR, KRIPA

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 06/20/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/886,984

Applicant(s)

HONG ET AL.

Examiner

Kripa Sagar

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Response to Amendment***

1. The amendment filed 3/26/03 has been entered. Claims 1,5 have been amended. No new matter has been added. Claims 2,3,4 have been cancelled.

Claims 1,5-18 are under consideration.

### ***Claim Rejections - 35 USC § 112***

2. Claims 5-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 5,18 teach a processing step wherein a third light blocking layer is selectively removed to expose an underlying second light blocking layer. (cl 5; l. 7-8 & cl.18;l. 13-15).

Applicant has argued that both layers are of Cr (p.7; top figure). It is not clear, how one would etch / remove the top Cr-layer without etching the lower Cr-layer. The specification does not provide for a method of selectively etching two adjacent layers of the same material.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1756

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1,5-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat. 6120942 to Reinberg in view of US Pat.5482799 to Isao et al.

The teachings of Reinberg and Isao and the motivation for combining them have been discussed in the previous office action presented 11/26/02.

Claims 1,5-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat. 6120942 to Reinberg in view of US Pat.5906910 to Nguyen et al.

The teachings of Reinberg and Nguyen and the motivation for combining them have been discussed in the previous office action presented 11/26/02.

5. Claims 1,5,13,18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat. 5354632 to Dao et al. in view of US Pat. 5065776 to Isao et al.

Dao teaches a rim-type and an outrigger-type phase shift masks with three areas of mutually different transmittances (Fig.7,9,10). Contact holes and windows are patterned using the mask (6;36-37). Dao teaches that the light blocking layers may be made of Cr while the phase shift layers may comprise an oxide (6;44-57). It teaches methods of adjusting the transmittance of the pattern areas; but it does not specifically teach multi-layered films or methods of forming the mask.

The '776 patent teaches a multilayered phase shift mask. (Fig.5) The mask layers may comprise Cr among other materials (11;12-31). It teaches forming multilayered films and etching them (Fig.5).

Art Unit: 1756

One of ordinary skill in the art at the time the invention was made would have been motivated to form Dao's attenuated phase shifting patterns using the layered method of the '776 patent because it teaches that while multi-layered films are conventional in the art, multilayered films of the '776 patent etch with straight sidewalls thereby providing defect-free masks with accurate patterns (2;38-49).

### ***Response to Arguments***

6. Applicant, in describing the invention, states that the scribe lane area has a high transmittance (p.6) whereas claim 1 recites a scribe lane area with 0% transmittance. For the purposes of this discussion the limitation of the claim is assumed to be correct.

7. The arguments presented on 3/26/03 have been considered but are not convincing.

Applicant has attempted to show with figures that the cited references do not teach the exact structural features of the instant mask. It is further argued that (a) Reinberg does not teach a phase shift layer (b) Isao does not teach a phase shift layer modified by a light-absorbing layer and (c) Nguyen does not teach a phase shift layer + light absorbing layer *applied to specified regions* of circuit structure. Applicant proceeds to argue that the instant mask is designed for specific applications such as a DRAM.

8. Examiner agrees that none of the cited references teaches *all* the elements of the instant claims. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re*

*Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant recognizes that attenuated phase shift mask with different transmittances in different regions are known in prior art (instant figs, 1A,!B; specification p.2-3). Applicant's mask differs structurally from those of admitted prior art in the number and sequencing of the attenuating layers; whereby the number of intensity levels is increased from two to three.

Reinberg teaches forming multi-level masks with various transmittances for different circuit regions; the various intensity levels are accomplished through multiple layers of light-blocking (attenuating) and light-transmitting materials. In addition it teaches that attenuated phase shift masks with different levels of transmission are known in prior art. Isao and Nguyen teach two methods of forming attenuated phase shift masks. While Isao's mask has only two layers, Nguyen teaches using multi-layered masks with multiple layers and multiple intensity levels. It would be facile for a skilled mask designer to design an attenuated phase shift mask with various transmittances in various parts of the circuit using Reinberg's method of multi-level attenuation and incorporating phase shift layers as taught by Isao or Nguyen. The motivation for this lies in the teachings of Isao and Nguyen wherein the phase shift layers are shown to facilitate defect detection in masks (Isao) and increase the contrast (Nguyen) of the images.

In response to applicant's argument that the instant invention is directed to a photomask for fabricating a DRAM, a recitation of the intended use of the claimed

Art Unit: 1756

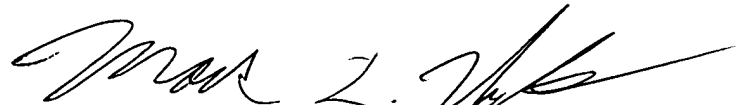
invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). The prior-art masks of Reinberg and Isao are capable of forming a pattern with areas of mutually different transmittances.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kripa Sagar whose telephone number is 703-605-4427. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



MARK F. HUFF  
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MH/ks  
June 10, 2003